

What is claimed is:

1. A method for compacting a diffuse gray edge, comprising the steps of:
identifying an observation window within continuous tone image data, said
observation window including a target pixel;
compacting horizontal features within said observation window;
compacting vertical features within said observation window; and
compacting corner features within said observation window.
2. The method according to **claim 1**, wherein said step of compacting horizontal
features comprises:
determining if said target pixel is within a diffuse horizontal edge;
shifting gray from a first pixel (A) that is not adjacent to a saturated pixel to a
second pixel (B) that is adjacent to a saturated pixel; and
updating a pixel value in response to said shifting step.
3. The method of **claim 2** wherein said gray is shifted from said first pixel A to said
second pixel B according to
- $$B' = \min(255, B+A)$$
- $$A' = A - [\min(255, B+A)] = A - B' + B$$
- wherein A' and B' are the values of said first and second pixels after shifting gray.
4. The method according to **claim 2**, wherein said step of updating a pixel value
comprises providing a modified value for said target pixel.
5. The method according to **claim 2**, wherein said step of updating a pixel value
modifies the values of pixels within said observation window.

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6. The method according to **claim 1**, wherein said step of compacting vertical features comprises:

determining if said target pixel is within a diffuse vertical edge;
shifting gray from a first pixel (A) that is not adjacent to a saturated pixel to a second pixel (B) that is adjacent to a saturated pixel; and
updating a pixel value in response to said shifting step.

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The method of **claim 6** 5 wherein said gray is shifted from said first pixel A to said second pixel B according to

$$B' = \min(255, B+A)$$

$$A' = A - [\min(255, B+A)] = A - B' + B$$

wherein A' and B' are the values of said first and second pixels after shifting gray.

8. The method according to **claim 1**, wherein:

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said step of compacting horizontal features modifies said target pixel and a first pixel adjacent said target pixel by shifting gray between said target pixel and said first pixel when said target pixel is within a diffuse horizontal edge;
said step of compacting vertical features modifies said target pixel and a second pixel adjacent said target pixel by shifting gray between said target pixel and said second pixel when said target pixel is within a diffuse vertical edge; and
said step of compacting corner features modifies a pixel within said compaction window when said target pixel is within a diffuse corner.

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The method according to **claim 8** 7 wherein said step of compacting horizontal features and said step of compacting vertical features are performed before said step of compacting corner features.

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10. The method according to **claim 1**, wherein said step of compacting corner features comprises:

determining if said target pixel is within a diffuse corner;

shifting gray from a first pixel (A) that is not adjacent to a saturated pixel to a

second pixel (B) that is adjacent to a saturated pixel; and

updating a pixel value in response to said shifting step.

11. The method of **claim 10** wherein said gray is shifted from said first pixel A to said second pixel B according to

$$B' = \min(255, B+A)$$

$$A' = A - [\min(255, B+A)] = A - B' + B$$

wherein A' and B' are the values of said first and second pixels after shifting gray.

12. The method of **claim 11** further comprising the step of shifting gray from a third pixel (C) to said second pixel B.

13. The method of **claim 12** wherein said gray is shifted from said third pixel C to said second pixel B according to

$$B'' = \min(255, B'+C)$$

$$C' = C - [\min(255, B'+C)] = C - B'' + B'$$

wherein B'' and C' are the values of said second and third pixels after shifting gray.

14. The method of **claim 13** further comprising the step of shifting gray from a fourth pixel (D) to said second pixel B.

15. The method according to **claim 14**, wherein said step of updating a pixel value comprises providing a modified value for said target pixel.

16. The method according to **claim 15**, wherein said step of updating a pixel value modifies the values of pixels within said observation window.

17. ¹⁶ In a printing system having a digital front end for processing image data to generate print ready data, a method for compacting a diffuse gray edge, comprising the steps of:

- receiving continuous tone image data;
- identifying a target pixel within said received continuous tone image data;
- analyzing pixels neighboring said target pixel to determine if said target pixel is within a diffuse gray edge; and
- compacting gray pixels within said diffuse gray edge.

18. ¹⁷ The method of **claim 17**, ¹⁶ wherein said step of compacting gray pixels within said diffuse gray edge comprises:

- analyzing pixels neighboring said target pixel to determine if said target pixel is within a diffuse horizontal edge;
- analyzing pixels neighboring said target pixel to determine if said target pixel is within a diffuse vertical edge; and
- analyzing pixels neighboring said target pixel to determine if said target pixel is within a diffuse corner.

19. ¹⁸ The method of **claim 17**, ¹⁶ wherein said step of compacting gray pixels within said diffuse gray edge comprises:

- shifting gray between pixels within a diffuse horizontal edge in response to a first edge condition;
- shifting gray between pixels within a diffuse vertical edge in response to a second condition; and
- shifting gray between pixels within a diffuse corner in response to a third condition.

20. ¹⁹ The method of **claim 19**, ¹⁸ wherein:

said step of shifting gray between pixels within a diffuse horizontal edge comprises shifting gray from a first pixel that is not adjacent to a saturated pixel to a second pixel that is adjacent to a saturated pixel;

said step of shifting gray between pixels within a diffuse vertical edge comprises shifting gray from a pixel that is not adjacent to a saturated pixel to a second pixel that is adjacent to a saturated pixel; and

said step of shifting gray between pixels within a diffuse corner comprises shifting gray from a pixel that is not adjacent to a saturated pixel to a second pixel that is adjacent to a saturated pixel.

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20. The method of claim 19, wherein: